Brading Neighbourhood Plan 2014 – 2027

Historic Environment & Climate Change

Supporting Document 3

Brading's Historic Environment and Climate Change

There is strong scientific consensus that greenhouse gas emissions resulting from human actions are causing significant and rapid changes to the climate. The Inter-Governmental Panel on Climate Change published its Fourth Assessment Report in 2007 which concluded that the global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 (IPCC 2007a). Among the climate changes noted in this report were a linear rise in global surface temperature over the last 50 years of twice that for the last 100 years and widespread changes in temperature extremes (IPCC 2007a to d).

Evidence from national Met Office sources shows the nature of some of these changes within the UK (Jenkins et. al. 2009a). The current set of climate change scenarios for England was released in 2009 and describes how the future climate of the UK is projected to evolve over the course of the 21st Century (Murphy et al. 2009; Jenkins et al 2009b; Jones et al 2009; Lowe et al 2009).

English Heritage, the Government's adviser on the historic environment, state that the evidence for a changing climate is markedly apparent in the South East of England (EH 2008, 1).

The Isle of Wight Climate Impacts Summary Report was produced for the Isle of Wight Council in November 2009 as a starting point for studying the effects of climate change on the Island (I2000 2009). It uses the latest figures from UK Climate Projections 2009 (Jenkins et al. 2009) at a 50% probability level to suggest the following projections for Climate Change on the Isle of Wight:

Temperature:

- Increase in annual mean winter temperature by 2020 = 1.3 degrees C;
- Increase in annual mean winter temperature by 2050 = 2.2 degrees C;
- Increase in annual mean winter temperature by 2080 = 3.1 degrees C;
- Increase in annual mean summer temperature by 2020 = 1.6 degrees C;
- Increase in annual mean summer temperature by 2050 = 2.8 degrees C;
- Increase in annual mean summer temperature by 2080 = 3.9 degrees C;

Precipitation:

- Increase in Winter precipitation by 2020 = 8%;
- Increase in Winter precipitation by 2050 = 17%;
- Increase in Winter precipitation by 2080 = 22%;
- Decrease in Summer precipitation by 2020 = 8%;
- Decrease in Summer precipitation by 2050 = 17%;
- Decrease in Summer precipitation by 2080 = 21%;

Sea Level:
Sea level along the Hampshire Coast had been predicted to rise at a steady 6mm a year but is now expected to rise exponentially:

- By 4mm per year until 2025;
- By 8.5mm per year until 2055;
- By 12mm per year until 2085;
- Then by 15 mm per year after 2085;
- Adding slightly to the effects of sea-level rise on the Island is the fact that land is dropping at a rate of about 1mm per year due to the earth's surface re-adjusting to the melting of the last ice sheets in Northern Europe.

Extreme weather events will increase in frequency, severity and duration, including:

- Droughts;
- Heatwaves;
- Heavy rain and flooding;
- Extreme cold spells;
- High winds;
- Storms.

Impacts of Climate Change on Brading's Historic Environment

1. Increased extremes of wetting and drying which increase weathering and erosion of structures and buildings, including:

- Physical changes to porous building materials and finishes due to rising damp;
- Crystallisation and dissolution of salts caused by wetting and drying affecting standing structures, archaeology, wall paintings, frescos and other decorated surfaces;
- Erosion of inorganic and organic materials due to flood waters;
- Relative humidity cycles/shock causing splitting, cracking, flaking and dusting of materials and surfaces, including corrosion of metals;
- Changes in deposition of pollutants through pH precipitation;

2. Changes in water table levels causing:

- Subsoil instability, ground heave and subsidence of buildings, structures and buried remains, especially on clay soils;
- Loss of stratigraphic integrity of buried archaeological deposits due to cracking and heaving from changes in sediment moisture;
- Data loss preserved in waterlogged/anaerobic/anoxic conditions;

3. Changes in soil chemistry causing:

- PH changes to buried archaeological evidence;
- Eutrophication accelerating microbial decomposition of organics;

4. Damage to Heritage Assets from fluvial or flash flooding, including:

- Penetration into historic buildings;
- Damage to historic contents such as museum collections;
- Flooding from more frequent intense rainfall will make some historic buildings more difficult to insure;
- Artefact scatters, buried sites and structures and upstanding structures and earthworks on low lying agricultural land have a significant risk of loss, episodic inundation, salination, storm surges or severe weather events (EH 2008e).

5. Storm damage

- Damage to veteran trees or historic plantings in historic parks and gardens and landscapes.
- Reduction in availability of native species for repair and maintenance of timber buildings.
- Damage to other Heritage Assets;

6. Other impacts:
   - Temperature change affecting the viability of certain garden designs/varieties of plants and historically authentic tree plantings in historic parks, gardens and landscapes.
   - The spread of pests and diseases as a result of a warmer climate and milder wetter winters, which will have an effect on plant species and structures e.g. a population of North African scorpions in the 18th-century Sheerness dockyard wall, which causes problems during maintenance (English Heritage, 2008e).
   - Biological damage to organic materials, interiors and furnishings by insects, moulds, fungi, invasive species such as termites.
   - Deterioration of structural façades due to thermal stress.
   - Freeze-thaw/frost damage inside brick, stone, ceramics and other materials that get wet and freeze before drying.

Guidance to reduce the impact of future climate change mitigation is included in Brading Historic Environment policies.